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British and Ipswich museums, believes that three species of Mastodon, *M. arvernensis*, *M. longirostris* and *M. borsoni* are represented; that *Hyæna arvernensis* and *H. antiqua* are probably identical with *H. striata*; and that there are two forms of *Sus*, the larger probably *S. erymanthius* or *S. antiquus*, the smaller *S. palæocherus*. The other quadrupeds are a tapir, more likely *T. arvensis* or *T. elegans* than *T. priscus*; *Hippotherium gracile*, and a Rhinoceros, probably the hornless *R. incisivus* (though *R. schleiermacheri* probably also occurred). A species of albatross was also represented.

*Quaternary*.—M. A. de Lapparent (Bull. d. l. Soc. Geol. de France, 1885, 456) traces the origin of the yellow silicious silt of the plateaux of the Paris basin. He points out that wherever the edge of this bed is seen against a line of heights, veins of small angular flints are seen, and shows that in character the mud exactly resembles that left by melted snow or running rain water—an oxidized mud which has always been in contact with the air. Nowhere else in France does this yellow mud cover so large an extent. It is, M. de Lapparent believes, the impalpable residue of the ancient Tertiary deposits, and its thickness is proportionate to that of those deposits. During the glacial period the flints, alternately subjected to freezing and melting, crumbled to pieces. M. de Mercey, in a subsequent note upon the same subject, shows that the Quaternary gravels were deposited in the water synchronously with the formation of the alluvium at higher levels. When these beds are found superimposed in the terraces of the valleys, the alluvium is not contemporaneous with the gravel it rests upon, but with that at a lower level. M. de Mercey also maintains the distinctness of an atmospheric bed of glacial mud, which was formed by the crumbling of the flints in the manner indicated by M. de Lapparent.

#### BOTANY.<sup>1</sup>

**BOTANICAL WORK OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.**—The recent meeting of the association at Buffalo showed no diminution of the interest taken by botanists in these annual gatherings. The number of botanical papers presented was small but of good quality. It is noticeable that they include no physiological subjects, and that the tendency is strongly toward the systematic side of botany, which may be taken as indicating the prominent position which this phase of botanical science still maintains with the leaders. The following is the list of papers presented:

1. The bulliform or hygroscopic cells of grasses and sedges compared. By W. J. Beal.

These cells are modified epidermal cells which occur in groups

<sup>1</sup> Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

upon one or both surfaces of most grass and sedge leaves. Their office appears to be to roll up the leaves when evaporation becomes excessive, and thus reduce the amount of exposed surface. The form and position of the cells is usually characteristic of each species, as was well illustrated by the paper. Charts showing enlarged sections of each leaf enabled the listener to intelligently follow the descriptions.

2. Synopsis of North American pines based on leaf anatomy. By J. M. Coulter.

The author has made a careful and critical study of the value of the histological character of leaves in determining the relationships of the members of this group of plants, and finds them of more service than heretofore recognized. Those especially to be relied upon are the resin ducts, the fibro-vascular bundles and the hypodermal tissues. The value of each is pointed out, and a classification of species given to accord with the results of the study.

3. The development of the Gymnosporangia of the United States. By W. G. Farlow.

The paper embodied the results of numerous cultures carried on in connection with work at the Harvard Cryptogamic laboratory. The spores of the Gymnosporangia were sown upon the leaves of several species of fruit trees, and more satisfactory results obtained than by previous experiments in this line in America. The author is enabled to connect with considerable certainty several species of this genus with as many species of *Roestelia*. The investigation has given rise to some troublesome problems which are left for future study.

4. Plan for laboratory work in chemical botany. By Lillie J. Martin.

Miss Martin does excellent service to botany in this country by calling attention to the advantages in studying the chemical constitution of plants as a department of botany. Her paper is particularly devoted to a consideration of the requirements of the student in taking up the subject, even to the matter of desk conveniences.

5. Memoranda of a revision of the North American violets. By Asa Gray.

The paper gives the results of a recent study of all available material, bringing this genus into much more satisfactory shape.

6. A revision of the North American species of the genus *Fissidens*. By C. R. Barnes.

The author has applied the same critical judgment to this group of mosses that has prevailed among our best systematists when treating of the flowering plants, and the result is undoubtedly of corresponding value. The most important change is the absorption of the genus *Conomitrium*.

Besides the above a number of papers presented to the association were more or less botanical. A brief reference to them will be sufficient for the present connection.

7. Certain chemical constituents of plants considered in relation to their morphology and evolution. By Helen C. De S. Abbott.

The author maintains that in determining the relationship of plants, their chemical constitution has important claims for consideration, and illustrates the proposition by tracing the occurrence of Saponin and some other substances.

8. Atavism the result of cross-breeding lettuce. By E. Lewis Sturtevant.

This gave a description of several plants of lettuce grown from seed of the previous year's crossing, among which were one or more clear instances of atavism.

9. A study in agricultural botany. By E. Lewis Sturtevant.

The type forms of cultivated vegetables, especially of parsnip, carrot, etc., are shown to be traceable to wild prototypes and not to have originated by human selection. Variation under culture has circumscribed limits.

10. Biology of timber trees with special reference to the requirements of forestry. By B. E. Fernow.

The author reviewed the various influences which affect the growth of forest trees, and pointed out the factors that especially need studying in developing the forest botany of America.

11. Preliminary analysis of a Honduras plant named "Chichipate," By Helen C. De S. Abbott

12. Preliminary analysis of leaves of *Juglans nigra*. By Lillie J. Martin.

13. On the presence of cane sugar and allantoin in ungerminated embryo of wheat. By C. Richardson and C. A. Crampton.

14. Tyrotoxico<sup>1</sup> (cheese poison); its occurrence in milk and its products, and a method of detecting it. By V. C. Vaughn.

15. Blue milk and ropy cream. By W. McMurtrie.

16. The bacterium of swine plague. By D. E. Salmon and Theobald Smith.

17. The variability of pathogenic organisms, as illustrated by the bacterium of swine plague. By Theobald Smith.

18. The theory of immunity from contagious diseases. By D. E. Salmon.

19. On some Carboniferous wood from Ohio. E. W. Claypole.

20. On the Cretaceous flora of North America. By J. S. Newberry.

THE BOTANICAL CLUB OF THE A. A. A. S.—About ninety registered as members of the club, which is a slightly larger number than last year. The club has proved a vigorous offspring, and shows fair prospect of years of future usefulness. The meetings were held in the room of the Biological section during the hour preceding the morning session of the association, and it is a fact worth noting that although it was inconveniently early, yet the club had a larger attendance than the Section of Biology, with its varied topics and more suitable hours.

The secretary of the club, Mr. J. C. Arthur, being occupied by duties pertaining to the association, Dr. N. L. Britton was appointed secretary *pro tem*. Professor J. M. Coulter was chairman. The meetings were held on Thursday, Friday, Monday and Tuesday mornings, the time being given to short papers;

notes, discussions and the interchange of information on botanical subjects. We may take occasion to reproduce some of the items of general interest in subsequent issues.

The arrangements made by the local botanical club for the entertainment of the club of the association were unusually complete and enjoyable. On Thursday a reception was given to the club at the residence of Hon. David F. Day, which proved a most delightful occasion. Members of the local club had taken much pains to bring, in addition to the hot-house plants, many wild flowers and plants for the decoration of the rooms, and as illustrations of local rarities.

Most of the botanists went to the falls and gorge of Niagara on Saturday, fair weather and ample time giving opportunity for considerable botanizing intermixed with sight-seeing. Monday afternoon a special excursion, by steamer, took the botanists to the Canadian shore of Lake Erie and to interesting botanizing ground.

Altogether the week was a delightful and profitable one; its success lay not only in the fact that the meetings of the club were well attended, but that the several social gatherings were equally so. While the members learned about methods and things, they also gained a knowledge of their fellow-laborers, and imbibed an important element to progressive work—enthusiasm.

The officers for the next year are Professor W. J. Beal, Agricultural College, Mich., chairman, and Mrs. E. G. Britton, New York city, secretary.

**BOTANICAL NEWS.**—Among the notable botanical papers which have recently appeared, the following may be mentioned: Artificial key to the genera of mosses recognized in Lesquereux and James' Manual of the mosses of North America, by Charles R. Barnes (Bulletin Purdue University, School of Science); A yellow opium mold (*Eurotium aspergillus-glaucus*), by William Trelease (Contrib. Department of Pharmacy of University of Wisconsin); Harfordia, a new genus of Eriogoneæ from Lower California, by C. C. Parry (Proc. Davenport Acad. Nat. Sci.); The banded-spore Trichias, by Geo. A. Rex (Jour. Mycology); The nectary of Yucca, by William Trelease (Torrey Bulletin); *Micrococcus pasteuri*, by George M. Sternberg (Jour. Royal Microscopical Society); Structure and distribution of resin passages of the white pine, by Etta A. Knowles (Bot. Gaz.); The Cayuga flora, by William R. Dudley (Bulletin of the Cornell University).

#### ENTOMOLOGY.

**THE ORGAN OF SMELL IN ARTHROPODS.**<sup>1</sup>—The question whether olfactory impressions as such are received by the Arthropoda,

<sup>1</sup> Abstract by A. S. Packard of a historical and critical study by Dr. K. Kræpelin. Separatdruck aus dem Osterprogramm der Realschule des Johanneums. Hamburg, 1883.